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ABSTRACT

Technology provides a new and effective tool for accelerating economic growth, and developing countries are embracing technology and education as the means toward attaining economic parity with the United States and other developed nations. Evidence suggests that this strategy is paying off. Developing countries are building a technology infrastructure and an educated workforce that will enable them to develop their economies at unprecedented speeds. Countries such as Mexico, China, and Brazil, which already have growing populations of technically literate workers, may eventually rival the United States in terms of economic prowess, similar to what Japan, Western Europe, and to some extent Korea have been able to do. The following facts are among those supporting this suggestion: (1) computer use in developing nations is increasing; (2) developing countries are acquiring more high-tech products; (3) urbanization foretells educational and economic growth; (4) literacy rates and postsecondary enrollments in developing nations are on the rise, and postsecondary enrollment growth rates in developing countries exceed those in the United States; (5) the economic growth rates in many developing countries have exceeded those in the United States; and (6) incomes rise as countries embrace technology. (Contains 15 figures.) (MN)

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Workforce Economic Trends
Summer 2001

Education and Technology Accelerate Economic Growth for Newly Emerging Economies

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SUMMER 2001

NATIONAL ALLIANCE OF BUSINESS

WORKFORCE ECONOMICS TRENDS

THE BUSINESS VOICE ON WORKFORCE DEVELOPMENT

EDUCATION AND TECHNOLOGY ACCELERATE ECONOMIC GROWTH FOR NEWLY EMERGING ECONOMIES

Technology provides a new and effective tool for accelerating economic growth, and developing countries are embracing technology and education as the means towards attaining economic parity with the U.S. and other developed nations. Evidence suggests that this strategy is paying off. Developing countries are building a technology infrastructure and an educated workforce that will enable them to leapfrog ahead at unprecedented speeds. Countries like Mexico, China and Brazil, which already have a growing population of technically literate workers, may eventually rival the U.S. in terms of economic prowess, similar to what Japan, Western Europe and to some extent, Korea, have been able to do.

With the expanding use of technology in developing countries, the supply of talented workers, especially those in the high-end skill areas like engineering and computer software development, is growing overseas. This means that the pool of highly skilled talent that U.S. companies will be able to draw from will begin to shift away from the U.S. labor market to other countries as the domestic supply of skilled workers lags behind demand.

- Between 1992 and 2000, the growth in computers per capita exceeded 550 percent in India, Russia, Brazil and Indonesia, and surpassed 1,000 percent in China.
- For developing countries, who are incorporating technology into their workforce at a very rapid rate, technology-aided productivity gains could mean long-term growth rates at two- to three-times that of the U.S.
- The postsecondary enrollments of both China and India are quickly approaching 50 percent of the U.S. total, and could surpass U.S. totals within the next few decades if recent year-to-year growth patterns continue.
- Economic gains for many developing countries during the past decade have been impressive. While the U.S. has enjoyed strong, steady annual growth of around 3 percent, many countries have experienced growth at nearly three to four times that rate.
- In 1972, less than half of the world's 500 largest companies were located outside of the United States. By 1999, 64 percent, or 321 of these companies were located beyond the U.S. boarders.
- India and China will add more people to their combined workforces between 1999 and 2010, 168 million workers, than will exist in the U.S. workforce by 2010, 157 million.

The developing world is growing up, and catching up economically to the U.S. The speed with which technology helps economic transformation to occur makes it likely that the ranks of the economic "haves" will swell in the coming decades. Economies will evolve through a combination of a growing labor supply, a better-educated and skilled workforce, and greater productivity through the increased use of technology. This is not a zero-sum game for the U.S. because stronger overseas markets mean greater opportunity for economic gain through international trade. However, a more developed and skilled international workforce does pose a potential threat to the competitive position of the United States, one that could be exacerbated if U.S. companies are forced to shift more of their production overseas to satisfy their growing need for skilled workers.

Workforce Economics Trends is a compilation prepared by the Alliance of research profiling our nation's current and future workforce. The information — statistics, facts and demographics — highlighted is intended to help advance efforts to build a quality workforce.

Alliance members receive *Workforce Economics Trends* six times per year, bimonthly. Further information and analysis about the state of the American workforce are provided through the Alliance's newsletters — *Work America*, *Workforce Economics* and our faxed bulletin *Legislative Update*.

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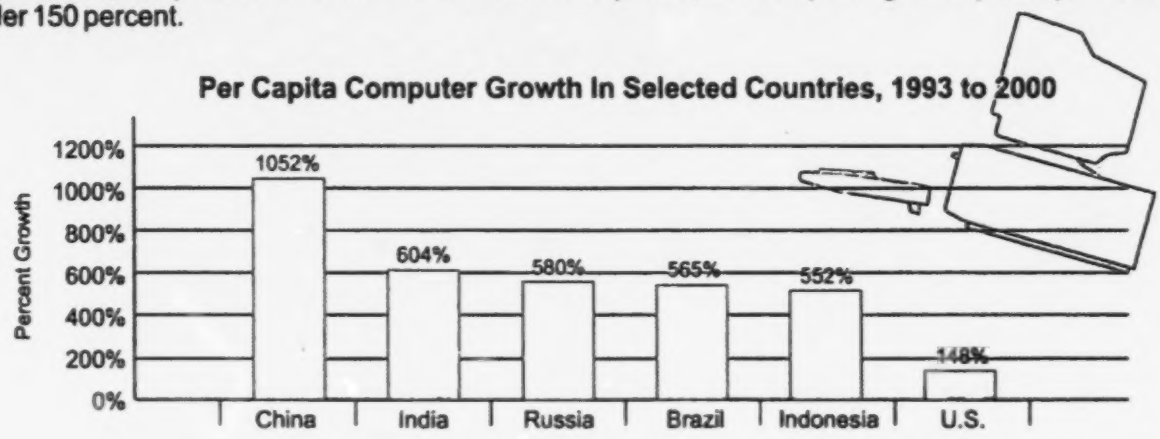
Computer Use In Developing Nations Is Growing...

Computer usage in developing nations is growing with astonishing speed. Between 1992 and 2000, the growth in computers per capita exceeded 550 percent in India, Russia, Brazil and Indonesia, and surpassed 1,000 percent in China. Over that same period, US computer growth per capita was just under 150 percent.

Per Capita Computer Growth In Selected Countries, 1993 to 2000

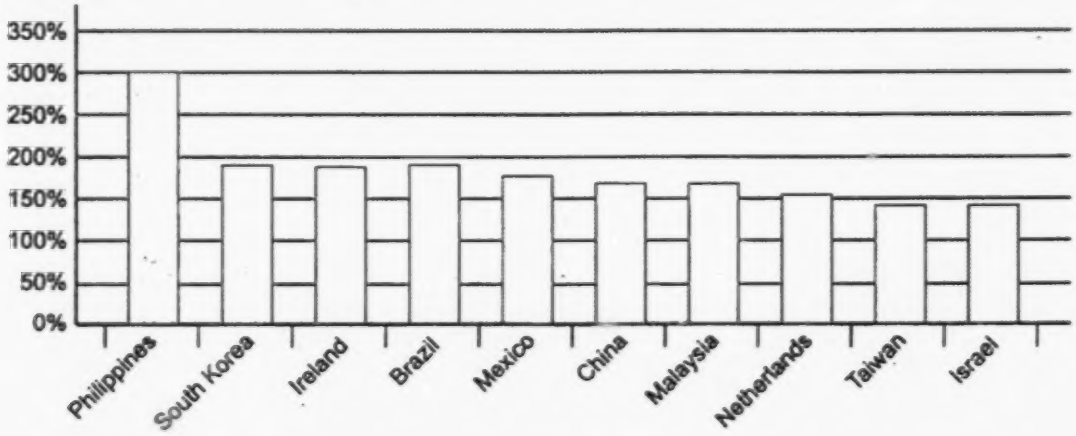


Source: Computer Industry Almanac, Inc. and The U.S. Government Working Group on Electronic Commerce. Leadership for the New Millennium: Delivering on Digital Progress and Prosperity, 2000

Developing Countries Are Acquiring More High Tech Products...

Further evidence of the growing use of technology in developing countries can be seen in their growing consumption of high-tech products. U.S. high-technology exports to many countries in the developing world have increased substantially in recent years and help explain the movement of many of these countries towards a stronger presence in the global economy.

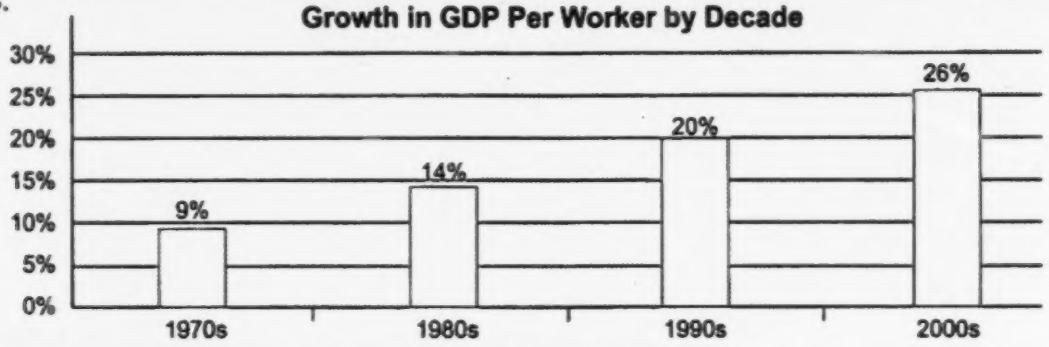
Percent Change In High Technology U.S. Exports to Selected Countries, 1993 to 1999



Source: The American Electronics Association. Cybernation 2.0: The U.S. High-Tech Industry and World Markets, 2000.

Productivity In Developing Countries Will Improve With Growing Use Of Technology...

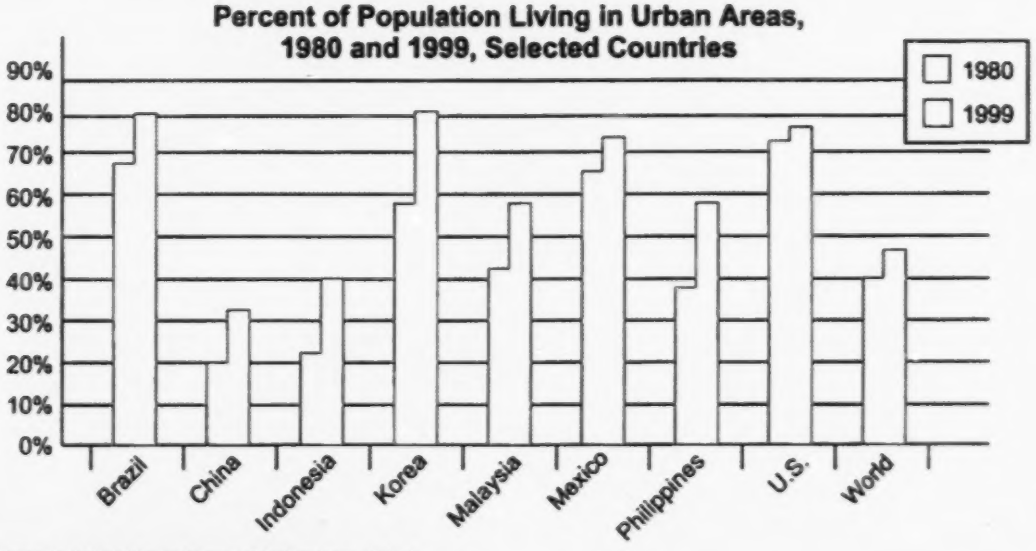
As technology gains wider use in developing countries, productivity will improve substantially. As seen in the U.S. economy, the increased use of technology in the workplace has been responsible for a steady rise in the productivity of U.S. workers. This is especially evident during the past decade, where the introduction of the personal computer in large numbers has helped accelerate productivity. During the next decade, U.S. productivity will be nearly twice that of the 1980's and nearly 3 times the output of the 1970's. For developing countries, who are incorporating technology into their workforce at a very rapid rate, such technology-aided productivity gains could mean long-term growth at two- to three-times that of the U.S.



Source: Federal Reserve Bank of Dallas. The New Paradigm, the 1999 Annual Report.

Urbanization Foretells Educational, Economic Growth...

Rising urbanization rates indicate a country in transition from a relatively low educated agrarian society to a higher educated industrial economy. Rapid increases in the urban population are indicative of strong economic growth. Moving to urban areas provides better access to jobs and schools for workers and their families. Since 1980, the urban population of many developing countries has increased substantially. China's urban population has grown from 20 percent to 32 percent of the total population, Indonesia's from 22 percent to 40 percent, and Mexico's from 66 to 74 percent.

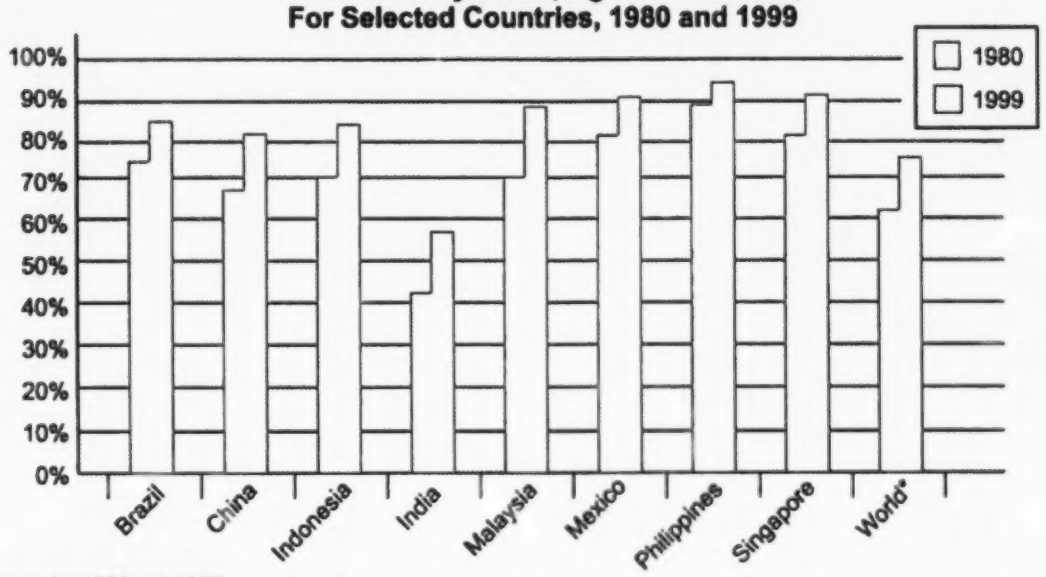


Source: World Bank, World Development Indicators. 2001

Literacy Rates On the Rise...

Literacy rates in many developing countries have been on the rise. Higher literacy rates mean a better-educated population and a workforce that is increasingly prepared to gain postsecondary training, use more sophisticated technology, and adapt to change and innovation, spurring economic growth and development.

Adult Literacy Rates, Age 15 and Older, For Selected Countries, 1980 and 1999

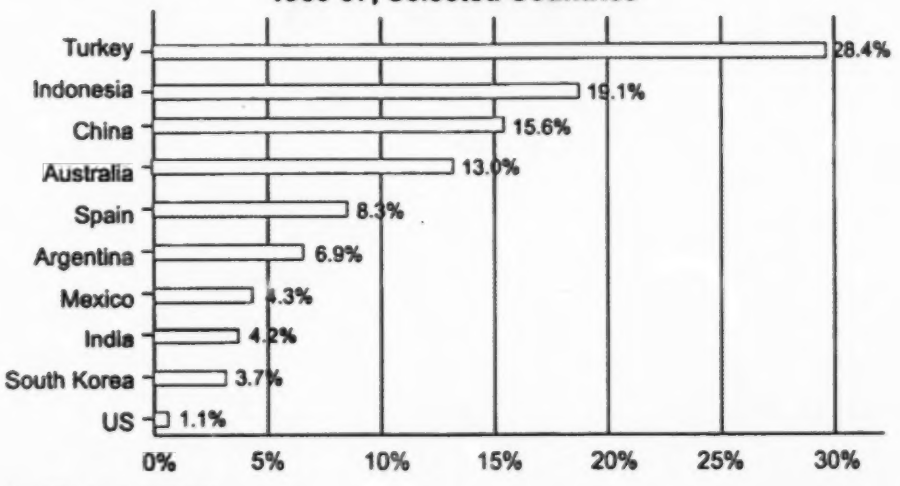


** Figures are for 1980 and 1997*
Source: World Bank, World Development Indicators, various years.

Dramatic Rise Of Postecondary Enrollments...

As developing countries embrace technology as a key element in their goal of attaining economic parity with the rest of the world, they recognize the critical importance of a highly educated and skilled workforce. This recognition has led to a dramatic rise in the number of secondary students continuing on to postsecondary education to obtain the skills necessary to ensure sustained economic development.

Average Annual Percentage Growth in Postsecondary Enrollment, 1980-97, Selected Countries



Source: NCES Digest of Ed Statistics 2000

International Postsecondary Enrollment Numbers Gaining On U.S...

Between 1980 and 1997, postsecondary enrollments in the United States increased by nearly 2.2 million to more than 14 million students. However, enrollment rates in U.S. postsecondary institutions decelerated during the past 7 years, while those in many other countries, both developed and developing, accelerated. As a result, during the same 17-year span, many other countries saw their postsecondary enrollments grow far faster than that of the U.S., significantly closing the enrollment gap. The postsecondary enrollments of both China and India are quickly approaching 50 percent of the U.S. total, and could surpass U.S. totals within the next few decades if recent year-to-year growth patterns continue.

Postsecondary Enrollment as a Percentage of U.S. Postsecondary Enrollment for Selected Countries, 1980 to 1997

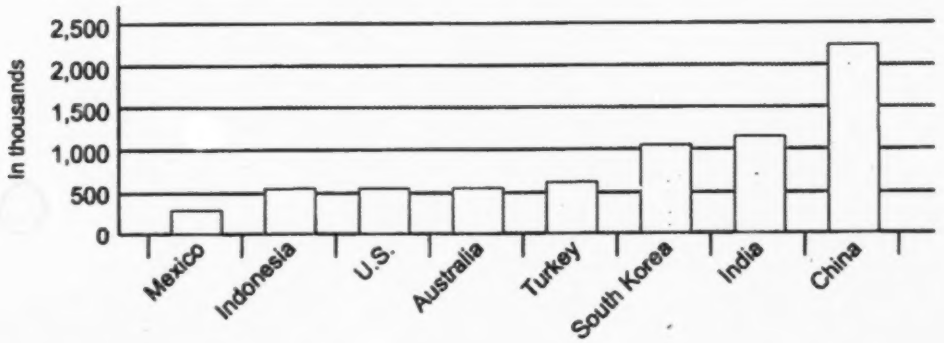
	1980	1990	1997
China	14%	28%	43%
India	29%	36%	42%
South Korea	20%	21%	27%
Indonesia	4%	13%	16%
Spain	6%	9%	12%
Mexico	8%	10%	11%
Turkey	2%	5%	10%
Argentina	4%	7%	8%
Australia	3%	4%	7%

Source: NCES Digest of Ed Statistics 2000

Postsecondary Enrollment Growth Rates In Developing Countries Exceed U.S...

Indeed, China's postsecondary enrollments since 1990 have exceeded U.S. growth by 1.7 million students. India and South Korea have also surpassed the U.S. enrollment numbers by a considerable margin. Other countries are seeing their postsecondary rolls increase at a pace similar to those of the U.S. Though enrollments in higher educational institutions in the U.S. will continue to climb, the enrollment rates in many developing countries will in all likelihood continue to climb faster.

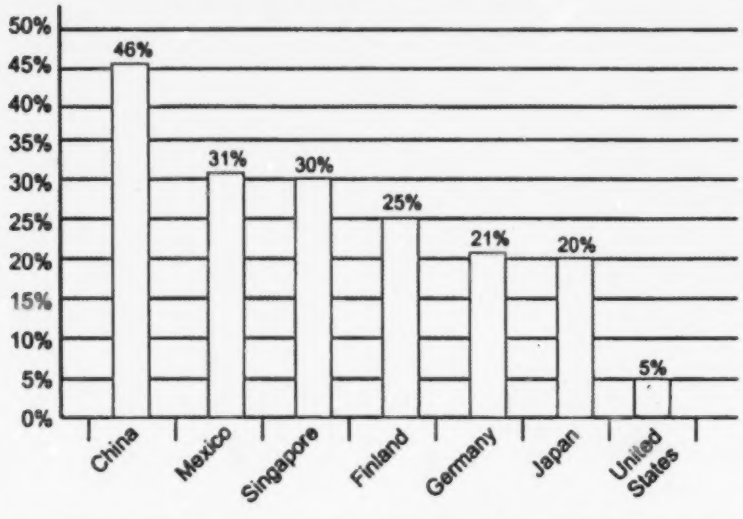
Total Postsecondary Enrollment Growth, 1990-97 Selected Countries



Source: NCES Digest of Ed Statistics 2000

Countries Are Addressing Growth Needs With High Concentration Of Technically Trained Workers...

Engineering Degrees as a Percent of Total Degrees Awarded by Country, 1998



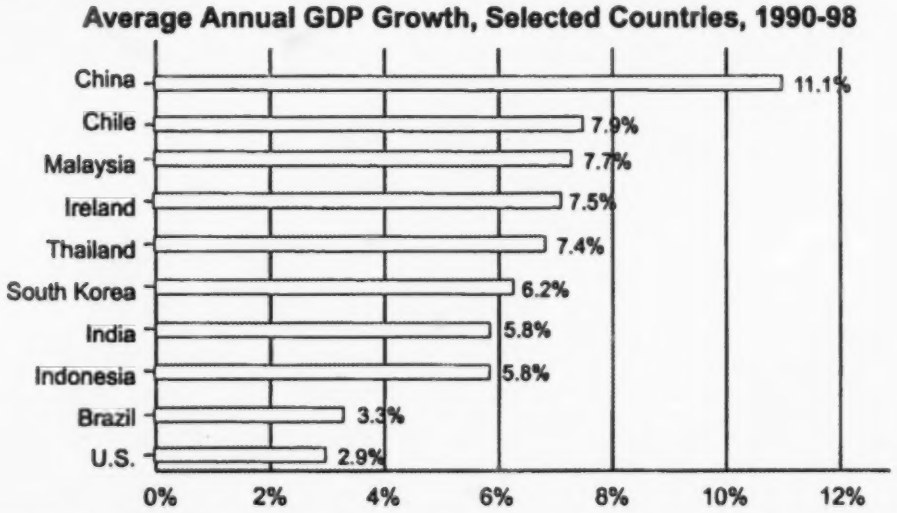
Source: National Science Board. Science and Engineering Indicators, 1998

The supply of technically trained workers is essential to sustained growth for countries at all developmental levels. Those countries that place a high priority on technically trained workers will succeed over time because their well of workers with the necessary skills should be sufficient to meet the growing demand. Historically the United States has had a high concentration of graduates in technical fields, such as engineering. However, in recent years those numbers have begun to decline. At the same time, many countries, both developed and developing, have placed engineering ahead of other disciplines as a priority to fill new positions and refill vacant ones, accounting for as much as 46 percent of all postsecondary degrees.

Economic Growth For Many Developing Countries Have Exceeded the US...

Economic gains for many developing countries during the past decade have been impressive. While the U.S. has enjoyed strong, steady annual growth of around 3 percent, many countries have experienced growth at nearly three to four times that rate. Three factors that likely have triggered and will continue to sustain this growth are reduced trading barriers, an increasingly skilled and educated workforce, and greater technological capacity.

Average Annual GDP Growth, Selected Countries, 1990-98



Source: World Bank, World Development Report 1999/2000

Level Of Trade Measures Growing Economic Status...

Average Annual Growth in Exports, Selected Countries, 1990-98

Country	Volume of Exports	Value of Exports
Chile	9.9%	9.7%
China	10.7%	15.8%
Indonesia	9.0%	9.4%
Ireland*	14.2%	14.0%
Malaysia	15.5%	14.1%
Mexico*	15.3%	16.1%
Philippines	18.6%	20.3%
United States*	6.8%	7.9%

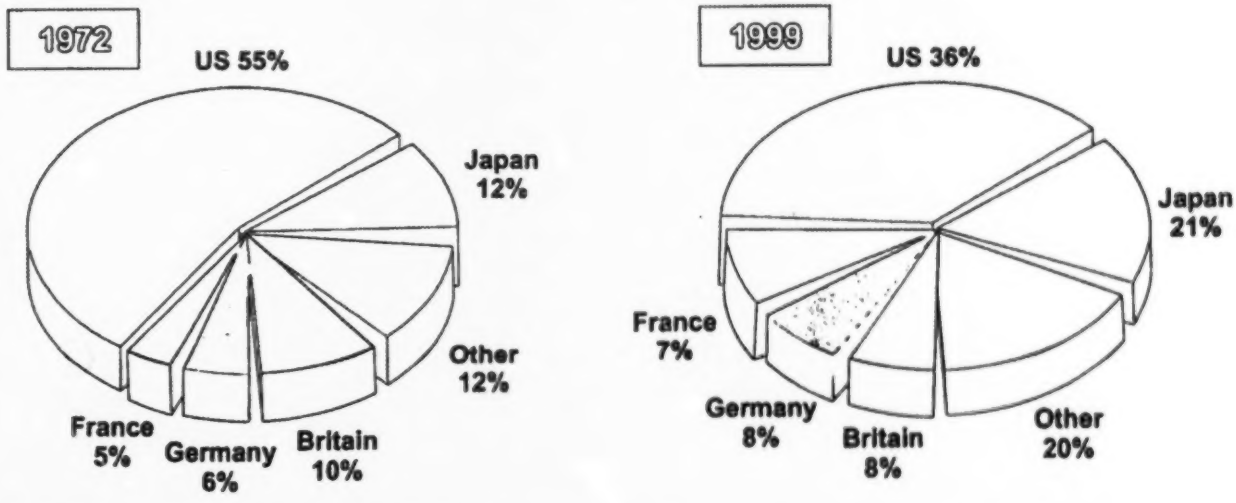
One measure of a country's growing economic status is its level of international trade. Historically, as countries begin to emerge as economic powers, they gain market share as low-cost exporters of goods to increase capital flow and encourage more foreign investment. Among the countries experiencing the greatest gains in exports during the past decade are those that have made the most progress in both the use of technology and in the educational attainment level of their workforce.

**Members of regional free trade blocs*
Source: World Bank, World Development Indicators 2001.

Companies Headquartered Overseas Is Increasing...

The share of the largest 500 companies in the world headquartered overseas is growing. In 1972, less than half of the largest companies were located outside of the United States. By 1999, 64 percent, or 321 of these companies were located beyond the U.S. borders. A growing number of these companies are located in developing regions of the world. China increased its share of the top 500 companies from six in 1998 to 10 in 1999, placing it on par with many of the largest industrialized countries, including South Korea (12), Canada (11), Switzerland (11), the Netherlands (11), and Italy (10). Other developing countries represented on the list include Brazil, Mexico, Malaysia, Russia, India, Venezuela and South Africa.

Location of the 500 Largest Industrial Corporations in the World by Country, 1972 and 1999



Note: Companies are ranked on the basis of revenues. *Source: Fortune Magazine (various issues). "The Global 500".*

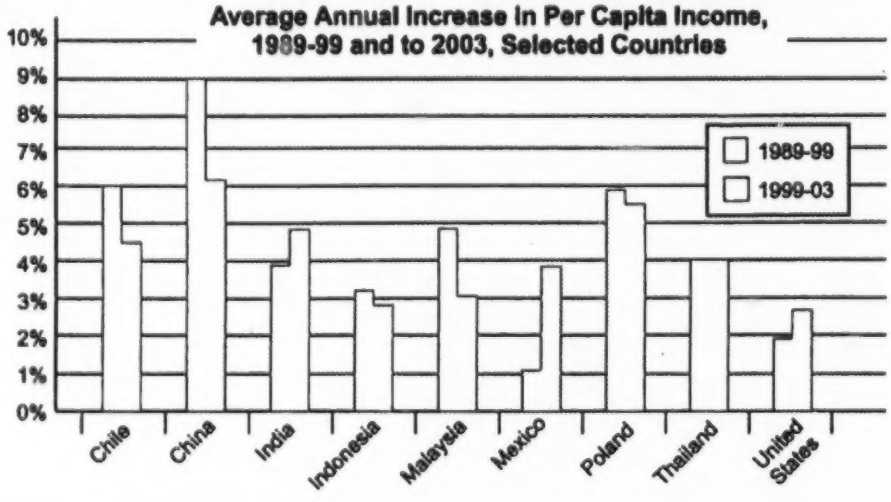
Labor Force of Developing World Grows Faster Than Global Average...

The size of the labor force for most of the developing world will grow faster than the global average through 2010. In the case of China, the growth rate may appear small but the size of the present workforce masks the enormity of the actual growth in workers, projected to be around 68 million. By contrast, the growth of the U.S. labor force will slow to less than one percent, adding roughly 12 million workers. In fact, India and China will add more people to their combined workforces between 1999 and 2010, 168 million workers, than will exist in the U.S. workforce by 2010, 157 million. And an ever-higher percentage of these workers will have postsecondary training. As overseas workforces grow and become both more educated and more technically savvy, the option to transfer many operations to overseas developers and manufacturers becomes more tangible as one possible solution to the looming shortage of skilled workers in the U.S.

Source: World Bank, World Development Indicators 2001.

Incomes Rise As Countries Embrace Technology...

As countries develop and inculcate technology into their economies, incomes rise. Since 1989, many countries in Asia, Latin America and Europe have seen annual increase of 4 percent or higher. Others, such as Mexico and East Asian countries, have endured currency shocks that slowed recent income growth but anticipate much stronger growth in the near future. As seen in the U.S. in recent years, and emphasized in the recent report "Creating a Development Dynamic" by the United Nations Development Programme, technology has a strong positive correlation to earnings. Rising personal income leads to increases in domestic consumption and savings, two elements key to long-term sustainable development.



Source: World Bank, Country Profiles 2000 and the Federal Reserve Bank of Dallas, The New Paradigm, 1999.